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REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application is anticipated under the provisions of 35 U.S.C. § 102 or made obvious under the provisions of 35 U.S.C. § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

I. OBJECTION TO CLAIMS 16-19

Claims 16-19 stand objected to for informalities. In response, the Applicants have amended claims 16-19 in accordance with the Examiner's suggestions. Specifically, claims 16-19 have been amended to depend from independent claim 15. Accordingly, the Applicants respectfully request that the objection to claims 16-19 be withdrawn.

II. REJECTION OF CLAIMS 1-2, 6-8, 10 AND 12-19 UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1-2, 6-8, 10 and 12-19 under 35 U.S.C. §102(e) as being anticipated by the Proctor application (United States Patent Application Publication No. 2003/0048770, published on March 13, 2003, hereinafter Proctor). In response, the Applicants have amended independent claims 1, 8 and 15, from which claims 2, 6-7, 10, 12-14 and 16-19 depend, to more clearly recite aspects of the present invention.

Proctor teaches a method for adapting a network access point to receive signals from wireless nodes in a network. In particular, Proctor teaches that a fixed-location network access point through which network communications (e.g., between network nodes) flow can determine whether a received signal is being transmitted by a known node (i.e., a node that has previously transmitted a wireless signal to the access point) or an unknown node (i.e., a node that has not previously transmitted a wireless signal to the access point). If the signal is coming from a known node, the access point adjusts a receiving antenna to a recorded angle that is known to be a best receiving angle for signals from the known node. Alternatively, if the signal is coming from an unknown

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node, the antenna searches for an optimal angle at which to receive the signal, and this angle is recorded for future reference (e.g., making the previously unknown node now a known node). However, Proctor does not teach or suggest that the network architecture is ad-hoc or dynamically changeable such that the devices that are capable of adjusting their antenna angles (that is, the network access point) are mobile.

The Examiner's attention is directed to the fact that Proctor fails to disclose or suggest the novel invention of adapting a receive antenna pattern of a mobile wireless communication device coupled to a wireless ad-hoc network, as claimed in Applicants' independent claims 1, 8 and 15. Specifically, Applicants' claims 1, 8 and 15, as amended, positively recite:

1. A method of adaptively controlling an antenna pattern of a mobile wireless communications device in a packet-switched wireless ad-hoc communications network, the method comprising the steps of:

receiving an electromagnetic signal over the packet-switched wireless ad-hoc communications network by a mobile wireless communication device having a receive antenna pattern;

determining if a source of the electromagnetic signal is an intended or unintended source; and

adapting the receive antenna pattern if the electromagnetic signal is from an unintended source. (Emphasis added)

8. An apparatus for adaptively controlling an antenna pattern of a mobile wireless network device in a packet-switched wireless ad-hoc communications network, the apparatus comprising:

first and second mobile antenna elements each receiving an electromagnetic signal from a source over the packet-switched wireless ad-hoc network and forming a receive antenna pattern;

a verification module, in communication with the antenna elements, receiving the signal from the antenna elements and verifying whether the source of the signal is an intended or unintended source; and

a controller in communication with at least one of the antenna elements and with the verification module to adaptively control the receive antenna pattern in response to a determination that the source of the electromagnetic signal is an unintended source. (Emphasis added)

15. In a packet-switched wireless ad-hoc communications network, a method for use by a mobile wireless communication device having a plurality of antennas to control a

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direction of communication over the network, the method comprising the steps of:

cooperatively producing by the plurality of antennas of the mobile wireless communication device an antenna pattern for exchanging electromagnetic signals over the packet-switched wireless ad-hoc communications network; and

adapting the antenna pattern produced by the plurality of antennas in response to an electromagnetic signal received over the packet-switched wireless ad-hoc communications network to control a direction of subsequent communication over the network. (Emphasis added)

Applicants' invention is directed to a method and apparatus for controlling the antenna pattern of a network communications card to improve signal quality between mobile devices communicating in a wireless packet-switched mobile ad-hoc network. In a wireless packet-switched mobile ad-hoc network (e.g., a network that operates without a fixed infrastructure), communications between two mobile network nodes (e.g., computing devices coupled to the network) may be disrupted by interference from an interfering node or other device (e.g., a telephone) emitting signals on the frequency used by the network. It is therefore desirable to enable the mobile nodes to detect the interference and to adapt their receive antenna patterns accordingly, so the effects of the interference can be minimized.

The present invention provides a method for adaptively controlling an antenna pattern of a mobile wireless communication device in a wireless ad-hoc network. Such capability has significant implications in ad-hoc networks, where user devices (e.g., mobile wireless communications devices) can move from place to place and will therefore be more likely than a fixed-location device (such as a network access point) to encounter signal environments where substantial interference is present. The mobile wireless communications device is adapted to detect whether a received signal is being transmitted from an intended (e.g., legitimate) or an unintended (e.g., interfering) source. If the source is an unintended source, the receiving mobile device adjusts its antenna receive pattern in order to mitigate the effects of the interference from the unintended source on the mobile device and on the ad-hoc network.

In contrast, Proctor teaches a network access point that adjusts an angle of a receiving antenna in response to a determination of whether or not the source node has

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previously transmitted communications to the access point. In other words, the network taught by Proctor has a fixed architecture (e.g., at least the access point at which signals are received is not mobile). Proctor does not teach or suggest that the architecture of the network is dynamically changeable, or that the device receiving signals and modifying its antenna pattern is a mobile device.

In contrast, the Applicants' invention positively claims the step of receiving an electromagnetic signal over a dynamically changeable, packet-switched wireless ad-hoc communications network by a mobile wireless communication device. The Applicants' invention thereby enables mobile communications devices within range of an unintended signal source to detect interference and to adapt their receive antenna patterns accordingly, thereby mitigating the effects of interference from the unintended source on the ad-hoc network, e.g., without the assistance of a coordinating central hub or network access point. Proctor's system is completely devoid of any teaching or suggestion relating to the need or desire to adapt the antenna patterns of mobile wireless devices in an ad-hoc wireless network.

Therefore, the Applicants submit that for at least the reasons set forth above, independent claims 1, 8 and 15, as amended, fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

Dependent claims 2, 6-7, 10, 12-14 and 16-19 depend from claims 1, 8 and 15, and recite additional features therefore. As such, and for at least the reasons set forth above, the Applicants submit that claims 2, 6-7, 10, 12-14 and 16-19 are not anticipated by the teachings of Proctor. Therefore, the Applicants submit that dependent claims 2, 6-7, 10, 12-14 and 16-19 also fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

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III. REJECTION OF CLAIMS 3-5, 9 AND 11 UNDER 35 U.S.C. § 103**A. Claim 3**

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Proctor in view the Locher patent (United States Patent No. 5,940,033, issued August 17, 1999, hereinafter Locher). In response, the Applicants have amended independent claim 1, from which claim 3 depends, as discussed above to more clearly recite aspects of the invention.

Proctor has been discussed above.

Locher teaches an antenna patterning system that predicts the behavior of an adaptive antenna array in order to improve antenna performance. In particular, Locher teaches that a plurality of input files (describing, for example, network communications links, locations and signal powers of jammers, and base station antenna configurations) form an antenna description that may be adapted and applied to the base station receivers in order to minimize interference in a network served by the base station. By applying an adapted antenna description to the base station antenna configuration, a designer can better evaluate an optimal number of null signals to apply in a given scenario in order to counter sources of interference in the network.

The Examiner's attention is directed to the fact that Locher, like Proctor, fails to disclose or suggest the novel invention of adapting a receive antenna pattern of a mobile wireless communication device coupled to a wireless ad-hoc network, as claimed in Applicants' independent claim 1, which has been recited above.

As discussed above, the Applicants' invention provides a method for mitigating interference with communications over a wireless ad-hoc communications network in which one or more mobile wireless communications devices are enabled to adapt their receive antenna patterns, e.g., without the assistance of a coordinating central hub or base station.

In contrast, both Proctor and Locher only teach a system that performs antenna patterning adjustments at a fixed network access point or base station, e.g., in order to address signals received from interfering or previously unknown sources. Neither Proctor nor Locher, alone or in any permissible combination, teaches or suggests a

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mobile communications device that is enabled to adapt its receive antenna pattern to mitigate effects from an interfering signal sent over a wireless ad-hoc communications network. Both Proctor's and Locher's systems are completely devoid of any teaching or suggestion relating to the need or desire to adapt the antenna patterns of mobile wireless devices in an ad-hoc wireless network.

Therefore, for at least the reasons set forth above, the Applicants submit that independent claim 1, as amended, fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Dependent claim 3 depends from claim 1, and recites additional features therefore. As such, and for at least the reasons set forth above, the Applicants submit that claim 3 is not made obvious by the teachings of Proctor in view of Locher. Therefore, the Applicants submit that dependent claim 3 also fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

B. Claims 4-5, 9 and 11

The Examiner rejected claims 4-5, 9 and 11 under 35 U.S.C. §103(a) as being unpatentable over Proctor in view the Youssefmir patent (United States Patent No. 6,141,567, issued October 31, 2000, hereinafter Youssefmir). In response, the Applicants have amended independent claims 1 and 8, from which claims 4-5, 9 and 11 depend, as described above to more clearly recite aspects of the invention.

Proctor has been discussed above.

Youssefmir teaches a method for adaptively processing received signals in a communications network base station including a smart antenna array. In a signal processing scenario, an existing receive processing scheme is based on a first set of signals for which characteristic information (e.g., signal processing training information) is known. However, the existing processing scheme may be modified by incorporating information about a second set of signals for which training (or other characteristic information) is unknown. This enables the base station to adaptively update a receive processing strategy, based on the second set of data, to account for the presence of a changing interference environment (e.g., by modifying receive weights assigned to

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signals received from each of a plurality of antenna elements).

The Examiner's attention is directed to the fact that Youssefmir, like Proctor, fails to disclose or suggest the novel invention of adapting a receive antenna pattern of a mobile wireless communication device coupled to a wireless ad-hoc network, as claimed in Applicants' independent claims 1 and 8, which have been recited above.

As discussed above, the Applicants' invention provides a method for mitigating interference with communications over a wireless ad-hoc communications network in which one or more mobile wireless communications devices are enabled to adapt their receive antenna patterns, *e.g.*, without the assistance of a coordinating central hub or base station.

In contrast, both Proctor and Youssefmir only teach a system that performs antenna pattern adjustments at a fixed network access point or base station of a network, *e.g.*, in order to address signals received from interfering or previously unknown sources. Neither Proctor nor Youssefmir, alone or in any permissible combination, teaches or suggests a mobile communications device that is enabled to adapt its receive antenna pattern to mitigate effects from an interfering (*e.g.*, an "unintended") signal sent over a wireless ad-hoc communications network. Both Proctor's and Youssefmir's systems are completely devoid of any teaching or suggestion relating to the need or desire to adapt the antenna patterns of mobile wireless devices in an ad-hoc wireless network.

Therefore, for at least the reasons set forth above, the Applicants submit that independent claims 1 and 8, as amended, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Dependent claims 4-5, 9 and 11 depend, either directly or indirectly, from claims 1 and 8, and recite additional features thereof. As such, and for at least the reasons set forth above, the Applicants submit that claims 4-5, 9 and 11 are also not made obvious by the teachings of Proctor in view of Youssefmir. Therefore, the Applicants submit that all these dependent claims also fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

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Conclusion

Thus, the Applicants submit that all of these claims now fully satisfy the requirements of 35 U.S.C. §102 and §103. Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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Date
Kin-Wah Tong, Attorney
Reg. No. 39,400
(732) 530-9404

Moser, Patterson & Sheridan, LLP
595 Shrewsbury Avenue
Shrewsbury, New Jersey 07702